DOCUMENT RESUME

ED 141 785 CS 003 570

AUTHOR Luft, Max; And Others
TITLE Trends in Relationships between Reading Achievement and Selected Independent Variables over a Five Year Period.
PUB DATE 77
NOTE 34p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York City, April 1977)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Effective Teaching; Grade 3; *Predictor Variables; Primary Education; *Reading Achievement; *Reading Research; Socioeconomic Influences; *State Surveys; *Testing Programs
IDENTIFIERS *Arizona

ABSTRACT

Since July 1970, Arizona has required that a standardized reading achievement test be administered annually to all third-grade pupils. Prior to test administration, data have been gathered on student traits, teacher background and teaching techniques, and characteristics of the school and the school district. Regression analyses were used to examine the relationship between each of the independent variables and reading achievement. During the testing period, the four variables that have had the highest correlation with total reading have been general ability to do school work, socioeconomic status, ethnic information, and language spoken at home. The four variables with the lowest correlation with total reading have been class size, basic phonics program, teacher self-improvement method, and institution where teacher received bachelor's degree. An extensive table listing the independent variables for each year of testing is included. (AA)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED141785

SOUTHWEST RESEARCH ASSOCIATES

a consortium for educational advancement

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Post Office Box 4092
Albuquerque, N.M. 87106
(505) 266-5781

TRENDS IN RELATIONSHIPS BETWEEN READING ACHIEVEMENT AND SELECTED INDEPENDENT VARIABLES OVER A FIVE YEAR PERIOD

Max Luft, Janice Lujan, and Katherine Bemis
Southwest Research Associates
Albuquerque, New Mexico

March, 1977

AERA Session No. 30.11

CS 003 570

Evaluation Question

Since July 1, 1970, the State of Arizona has required that a standardized reading achievement test be adopted by the State Board of Education, and administered annually to all third grade pupils. The results of the test administered under this statute are reported to the State Board of Education. The law requires "the results shall include the score of each individual pupil, the score of each classroom, the score of each school and such other information or comparative data as the State Board may require."[1]

In meeting the state mandate, the Board has conducted many studies, and asked many questions. Specifically, two of the evaluation questions posed were:

(1) What is the relationship of a series of independent teacher, school and student variables to reading achievement of third grade students enrolled in the public schools of Arizona? and,

(2) What percent of the variance of the standardized reading test scores can be accounted for through identified independent teacher, school and student variables for students in the third grade in the public schools of Arizona?

[1] Arizona Revised Statutes, Title 15:1131-1134.

Evaluation Techniques

For the last six years the legislature of the State of Arizona has mandated a standardized reading achievement test be administered to all third grade students who are enrolled in the public schools of Arizona. Prior to test administration, data were gathered on student traits, teacher background and teaching techniques and characteristics of the school and the school district. At each test administration, data were gathered on up to 14 independent variables. As the tests were scored, the raw scores and categorizations of the independent variables were stored on computer tape. A correlation matrix was then generated to identify the relationship between each independent variable and the criterion raw reading test score. A linear regression was then performed to identify the value of the multiple correlation coefficient.

Specifically, for each independent variable a multiple regression was run. This was done by identifying various levels of the independent variables as dichotomous conditions (occuring/not occuring). A correlation matrix was then generated determining the relation between the categorized level of the variable and total reading raw score. To determine the relation between the independent variable (i.e., ethnic group) and the dependent variable (reading raw score), a multiple regression was computed using each level of the independent variable as an input variable. The following table reflects an example for calculation of the multiple correlation for ethnic group.

MULTIPLE REGRESSION

SELECTION . . . ETHNIC GROUP

VARIABLE	MEAN	STANDARD DEVIATION	CORRELATION X vs Y	REGRESSION COEFFICIENT	STD. ERROR OF REG. COEF.	COMPUTED T VALUE
ANGLO WHITE	0.67106	0.46983	0.34978	9.49913	0.64580	14.70908
SPANISH SURNAMED	0.19996	0.39997	-0.25500	-8.00074	0.67961	-11.77251
BLACK	0.03869	0.19285	-0.12093	-10.15051	0.85320	-11.89701
INDIAN	0.04674	0.21108	-0.16982	-13.95482	0.81922	-17.03427
ORIENTAL	0.00497	0.07035	0.03088	13.94870	1.72174	8.10151
NOT INCLUDED	0.00651	0.08044	-0.00075	3.60888	1.53558	2.35018
DEPENDENT RAW SCORE	91.82971	23.17978				

INTERCEPT	88.00706
MULTIPLE CORRELATION	0.36829
STD. ERROR OF ESTIMATE	21.55254

ANALYSIS OF VARIANCE FOR THE REGRESSION

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES
ATTRIBUTABLE TO REGRESSION	6	2652320.00000	442053.31250
DEVIATION FROM REGRESSION	36386	16901728.00000	464.51172
TOTAL	36392	19554048.00000	

Data Sources

Over a six year period, data were gathered on over 200,000 students. The following table indicates the number of students participating in each testing session, and the number of independent variables on which data were gathered.

Summary of Data Gathered

Testing Date	Number of Students	Student Variables	Teacher/School Variables
January 1971	35,882	3	3
January 1972	36,388	5	3
January 1973	36,211	6	7
October 1973	35,508	5	8
October 1974	34,409	4	7
October 1975	33,972	5	9
October 1976	34,482	3	2

During the first three testing sessions, the Metropolitan Achievement Test, Forms F, G and H respectively were used. During the last four testings, the Stanford 73, Primary Level II, Form A, was used as the test instrument.

In excess of thirty different independent variables have been analyzed during the last seven testing sessions. The following tables indicate the variable and the quantifiable levels of the variables.

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-75	1976-77
SEX: Male Female		X	X	X		X	X
ETHNIC GROUP: Anglo White Spanish Surnamed Black Indian Oriental None of above or other	X	X	X	X	X	X	
LANGUAGE SPOKEN AT HOME: English English and Spanish Spanish Indian English and Indian English and any other Oriental	X						
LANGUAGE SPOKEN AT HOME: English English and Spanish Spanish Indian English and Indian Oriental		X					
LANGUAGE SPOKEN AT HOME: English English and Spanish Spanish Indian English and Indian Oriental Other combinations not included above			X	X	X	X	X
GENERAL ABILITY TO DO SCHOOL WORK (STANDARDIZED MEASURE): Below average; IQ of 89 or below Average; IQ of 90-110 Above average; IQ of 111 or above	X	X	X	X	X	X	X

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
LENGTH OF CONTINUOUS ATTENDANCE IN DISTRICT: Less than 3 months since start of current year Less than 1 full year More than 1 year but less than 2 years Two school years Started 1st grade here Started Kindergarten here	X						
SOCIO-ECONOMIC STATUS: Below average (less than $3,000) Average ($3,000-$10,000) Above average (above $10,000)	X						
SOCIO-ECONOMIC STATUS: Below $3,000 $3,000-$6,000 $6,000-$10,000 $10,000-$15,000 $15,000-$20,000 Above $20,000		X	X				
FORMAL PRESCHOOL EXPERIENCE: Day Care only Kindergarten only Nursery only Head Start only Day Care and Head Start Day Care, Head Start, and Kindergarten Head Start and Kindergarten Nursery, Head Start, and Kindergarten Special Program and Kindergarten None	X						
FORMAL PRESCHOOL EXPERIENCE: None Less than 1 year Head Start 1 year Head Start Less than 1 year Kindergarten 1 year Kindergarten More than 1 year experience		X	X	X	X		

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
FORMAL PRESCHOOL EXPERIENCE:						X	
Not prior to Grade 1							
K only							
K + less than 1 year Head Start							
K + 1 year or more Head Start							
K + less than 1 year private preschool							
K + 1 year or more of private preschool							
Combination							
BASIC READING PROGRAM NOW IN USE:	X						
Allyn and Bacon							
Harper and Row							
Lippincott							
MacMillan							
Scott-Foresman							
Combination of above							
Other than above							
BASIC READING PROGRAM NOW IN USE:		X					
None							
Language experience							
Allyn and Bacon							
Harper and Row							
Lippincott							
MacMillan							
Scott-Foresman							
Sullivan							
SRA							
Local program							
BASIC READING PROGRAM NOW IN USE:			X				
None							
Allyn and Bacon							
Harper and Row							
Lippincott							
MacMillan							
Scott-Foresman							
SRA							
Sullivan							
Open Court							
Local teacher-made							

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
BASIC READING PROGRAM NOW IN USE: None Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman				X			
BASIC STATE ADOPTED READING PROGRAM: Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman					X		
TYPE OF READING GROUP IN SECOND GRADE: Individualized Homogeneous Heterogeneous Other School						X	
READING PROGRAM USED IN SECOND GRADE: Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman Student attended other school						X	
READING PROGRAM USED IN SECOND GRADE: Economy Holt, Rinehart and Winston Houghton Mifflin Lippincott SRA Other Text Student attended other school							X

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
READING PROGRAM USED IN FIRST GRADE:						X	
Allyn and Bacon							
Harper and Row							
Lippincott							
MacMillan							
Scott Foresman							
Student attended other school							
BASIC PHONICS PROGRAM NOW IN USE:	X						
Economy							
Ginn and Company							
Language Arts							
Lyons and Carnahan							
Phonovisual Products							
Combination of above							
Other than above							
BASIC PHONICS PROGRAM NOW IN USE:		X					
Economy							
Ginn and Company							
Language Arts							
Lyons and Carnahan							
Phonovisual Products							
Reading Text Program							
Other commercial							
Non-commercial							
None							
BASIC PHONICS PROGRAM NOW IN USE:			X				
Economy							
Ginn and Company							
SRA Distar							
Lyons and Carnahan							
Phonovisual Products							
Basic Reading Text							
Key Vocabulary							
Teacher designed							
Other commercial							

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
BASIC PHONICS PROGRAM NOW IN USE:							
None				X			
Economy							
Ginn and Company							
Language Arts							
Lyons and Carnahan							
Phonovisual Products							
BASIC PHONICS PROGRAM IN USE:							
None					X		
Economy							
Ginn and Company							
Language Arts							
Lyons and Carnahan							
Phonovisual Products							
Local Teacher/District							
Other commercial							
PHONICS PROGRAM USED IN SECOND GRADE:							
None						X	
Economy							
Ginn							
Language Arts							
Lyons and Carnahan							
Phonovisual Products							
Teacher/District made							
Other commercial program							
Student attended other school							
PHONICS PROGRAM USED IN FIRST GRADE:							
None						X	
Economy							
Ginn							
Language Arts							
Lyons and Carnahan							
Phonovisual Products							
Teacher/District made							
Other commercial program							
Student attended other school							

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
TYPE OF PHONICS GROUP IN SECOND GRADE:						X	
No phonics							
Individualized							
Homogeneous							
Heterogeneous							
Student attended other school							
SIZE OF PHONICS GROUP:				X	X		
No phonics instruction							
Homogeneous 1-5							
Homogeneous 6-10							
Homogeneous 11-15							
Homogeneous 16-25							
Heterogeneous 2-5							
Heterogeneous 6-10							
Heterogeneous 11-15							
Heterogeneous 16-25							
Heterogeneous 26 +							
SUPPLEMENTARY READING PROGRAMS IN USE:				X	X		
None							
SRA							
Sullivan Readers							
Open Court							
Local Teacher Made							
Key Vocabulary							
Other commercial							
LIBRARY FACILITY:	X						
None							
School library with certified librarian							
School library with teacher supervision							
School library with clerk supervision							
Classroom collections only							
Access to Public Library only							
Bookmobile only							
Public Library and Bookmobile							

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION: Less than 30 minutes 31-35 minutes 36-40 minutes 41-45 minutes 46-50 minutes 51-55 minutes 56 or more	X						
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION Less than 30 minutes 31-35 minutes 36-40 minutes 41-45 minutes 46-50 minutes 51-55 minutes 56-60 minutes 61-65 minutes 66-70 minutes More than 71 minutes		X					
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION 0-30 minutes 31-40 minutes 41-50 minutes 51-60 minutes 61-70 minutes 71-80 minutes 81-90 minutes 91-100 minutes 101-110 minutes 111 or more			X				
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION Less than 35 minutes 36-45 minutes 46-55 minutes 56-60 minutes 61-70 minutes 71-80 minutes 81-90 minutes 91 or more				X	X		

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
MINUTES PER PUPIL PER DAY OF SUPPLEMENTARY INSTRUCTION:				X	X		
None							
Less than 35 minutes							
36-45 minutes							
46-55 minutes							
56-60 minutes							
61-70 minutes							
71-80 minutes							
81-90 minutes							
91 minutes or more							
SCHOOL NUTRITION PROGRAM:	X						
Breakfast only							
Breakfast and lunch							
Lunch only							
Lunch and snack							
Milk program only							
None available							
HEALTH SERVICES:	X						
Visual screening only							
Audio screening only							
Dental screening only							
Physical screening only							
Any combination of the above							
All of first four services above							
No health services							
PRIMARY INSTRUCTIONAL MODE:	X						
Basic Textbook							
Individual Instruction							
Programmed Instruction							
Language Experience							

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
YEARS TEACHING EXPERIENCE: First year of teaching — 5 years experience 1 year experience — 6 years experience 2 years experience — 7 years experience 3 years experience — 8 years experience 4 years experience — 9 or more years experience	X						
YEARS TEACHING IN THIS DISTRICT: First year this dist. — 5 years this district 1 year this district — 6 years this district 2 years this district — 7 years this district 3 years this district — 8 years this district 4 years this district — 9 years or more this district	X						
FORMAL EDUCATION OF TEACHER: B.A. or B.S. degree — M.A. + 10 hours B.A. + 10 hours — M.A. + 20 hours B.A. + 20 hours — M.A. + 30 hours B.A. + 30 hours — Educational Specialist M.A. or M.S. degree — Doctorate	X						
AGE OF BUILDING: New this year — 10-14 years old 1-4 years old — 15-19 years old 5 years old — 20 or more years old 6-9 years old	X						
DESIGN OF BUILDING: One Room School House Two Room School House Four Room School Traditional Self-contained Open interior construction	X						
PHYSICAL STRUCTURE OF CLASSROOM: Closed (traditional) Open						X	

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
SIZE OF SCHOOL AND SETTING: Large system (25,000 or more) Medium system (3,000 to 24,999) Small system (300 to 2,999) Very small system (1 to 299)	X						
AVERAGE CLASS SIZE: 1-5 pupils 6-10 pupils 11-15 pupils 16-20 pupils 21-25 pupils 26-30 pupils 31-35 pupils 36-40 pupils 41 or more pupils	X						
CLASSROOM CLIMATE: No cooling, no heating Evaporative cooling only Refrigeration cooling only Heating only, no cooling Heating with evaporative cooling Heating with refrigeration cooling	X						
READING PERFORMANCE OBJECTIVES: Not in use 1. District choice 2. School choice 3. Teachers collectively 4. Teachers individually Combination of 1 and 2 Combination of 1,2 and 3 Combination of 1,2,3 and 4 Combination of 3 and 4 Other combination			X				
TEACHER HOLDS BACHELOR'S DEGREE FROM: Arizona State Grand Canyon Northern Arizona University of Arizona		X					
TEACHER AIDE AVAILABILITY: None ¼ time Aide ½ time Aide Full time Aide More than one Aide		X					

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
CLASSROOM LEARNER FACILITATOR SITUATION: 1. Certified teacher 2. More than 1 certified teacher 3. 1 or 2 above and student aide 4. 1 or 2 above and volunteer aide 5. 1 or 2 above and paid aide 6. 1 or 2 above and student teacher 7. Combination of 2 and 5 8. Combination of 2 and 4 9. Combination of 2, 3, 4, and 5 10. Other combination			X				
TEACHER HOLDS MASTER'S DEGREE FROM: Arizona State Grand Canyon Northern Arizona University of Arizona Brigham Young Other out of state		X					
TEACHER EXPOSURE TO READING INSTRUCTION COURSE: None One Two Three Four Five Six Seven Eight Nine		X					
TEACHER SELF-IMPROVEMENT METHOD: 1. Professional reading 2. School workshops 3. University workshops 4. Community workshops Combination of 1 and 2 Combination of 1 and 3 Combination of 1 and 4 Combination of 1,2,3 and 4 Other combination			X				
CLASS SIZE: 1-4 pupils 5-9 pupils 10-14 pupils 15-19 pupils 20-24 pupils 25-29 pupils 30-34 pupils 35-39 pupils 40-44 pupils 45 pupils or more				X			

ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
SPECIAL EDUCATION PROGRAM:						X	X
No Special Education Requirements							
Gifted							
EMH							
Hearing							
Homebound							
Multi-Handicapped							
Physically Handicapped							
Learning Disability							
Speech							
Visually Handicapped							
SIZE OF READING GROUP:				X	X		
Individualized							
Homogeneous 2-5							
Homogeneous 6-10							
Homogeneous 11-15							
Homogeneous 16-25							
Heterogeneous 2-5							
Heterogeneous 6-10							
Heterogeneous 11-15							
Heterogeneous 16-28							
Heterogeneous 26 +							

Results/Conclusions

The results of the data analysis indicate the degree to which each of the independent variables were related to reading achievement. From this information the coefficient of determination can be calculated. Each year the State Board of Education has the option of modifying the selected independent variables. Those which had the highest correlation were usually retained.

During the testing period, the four variables which have had the highest correlation with total reading are:

Correlation	Variable
.560	General ability to do school work
.402	Socio-Economic status
.371	Ethnic information
.359	Language spoken at home

The variables which have had the lowest correlation with total reading over the testing period are:

Correlation	Variable
.086	Class size
.080	Basic phonics program
.059	Teacher self-improvement method
.047	Institution where teacher received Bachelor's degree

It must be noted that the variables over which it is difficult to exhibit control account for the greatest correlations; and those which could be controlled have smaller correlations.

The greatest overall prediction of reading scores from the independent variables yielded a multiple correlation of .661. The resultant coefficient of determination was .44. The following data are for that testing period, 1972-1973.